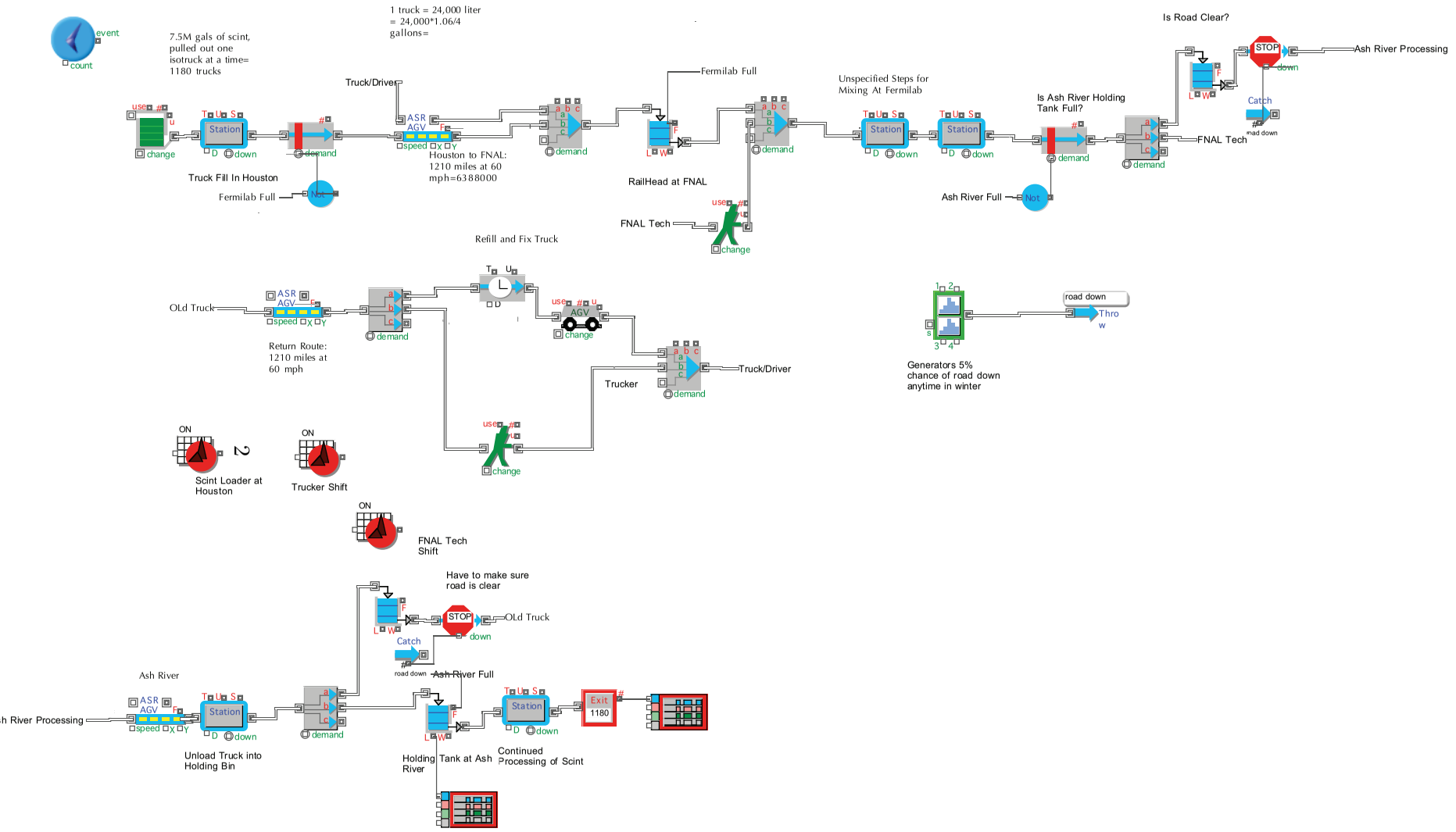
NOνA MEMORANDUM November 29, 2005

To: NOνA Collaboration
From: R. Bernstein
Subject: First Pass at Filling Process Simulation: 192-v0

I have a first pass of a operations simulation. It runs under Extend, as does the module assembly simulation described in Nova-72-v1 and will be joined with it. Here is a description of the process:

1. I assume 7.5 M gallons in Houston. One isotanker holds 24K liters implying 1180 tankers.
2. One tanker leaves per day with a trucker.
3. The truck travels to Fermilab at 11 hr days at 60 mph.
4. The railhead can hold up to five isotankers. If more than that pile up for whatever reason the Houston facility stops sending tankers.
5. I have two processes, each taking 12 hrs, at the railhead governed by a FNAL tech who works a 40 hr week. This will obviously cause backups and conflicts depending on when the truckers arrive and needs to be thought out further.
6. When done at FNAL we check the weather to the far site; random downtimes occur during the winter. Right now it is a 5% probability that from Dec to March, the road will be down for 24 hrs. This is tunable.
7. If the road is clear, the truck proceeds to the far site; the far site can hold five isotankers. If that capacity is exceeded no one leaves FNAL and the hold cascades back thought the system.
8. The empty tanker then proceeds back to Houston.

An interesting and obvious variant is to have two truck loops: Houston to FNAL and return, FNAL to the far site and return. The current state of the simulation is reproduced on the next page. The result is that it takes 42,000 hrs = 4.8 years as modeled.


event
count
7.5M gals of scint, pulled out one isotruck at a time= 1180 trucks
1 truck = 24,000 liter = 24,000*1.06/4 gallons=
Truck/Driver
Station
change
down
demand
Truck Fill In Houston
Fermilab Full
Not
ASR
AGV
speed
Houston to FNAL: 1210 miles at 60 mph=6388000
Fermilab Full
RailHead at FNAL
FNAL Tech
Unspecified Steps for Mixing At Fermilab
Is Ash River Holding Tank Full?
Ash River Full
Is Road Clear?
STOP
Ash River Processing
Catch
road down
FNAL Tech
Refill and Fix Truck
OLd Truck
Return Route: 1210 miles at 60 mph
Trucker
Truck/Driver
Generators 5% chance of road down anytime in winter
road down
Thro
w
ON
Scint Loader at Houston
Trucker Shift
FNAL Tech Shift
Have to make sure road is clear
OLd Truck
Ash River
Ash River Full
Unload Truck into Holding Bin
Holding Tank at Ash River
Continued Processing of Scint
Exit
1180